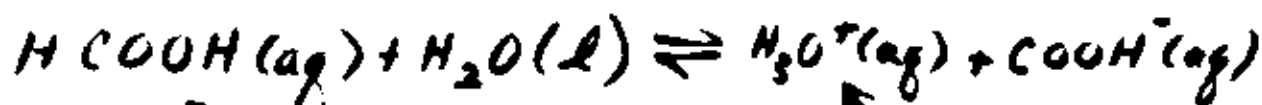


$$22. [\text{HCOOH}] = 0.1000 \text{ M}$$

$$[\text{H}^+] = 4.2 \times 10^{-3} \text{ M}$$



$$K_a = \frac{[\text{H}^+(\text{aq})][\text{COOH}^-(\text{aq})]}{[\text{HCOOH}(\text{aq})]} \quad \nearrow \text{H}^+$$

	HCOOH	H_3O^+	COOH^-
I	0.1000	0	0
C	-4.2×10^{-3}	4.2×10^{-3}	4.2×10^{-3}
E	0.0958	4.2×10^{-3}	4.2×10^{-3}

$$K_a = \frac{(4.2 \times 10^{-3}) \times (4.2 \times 10^{-3})}{0.0958} = 1.8 \times 10^{-4}$$

$$23. [\text{HA}] = 0.20 \text{ M}$$

$$[\text{H}^+] = 9.86 \times 10^{-4} \text{ M}$$



$$K_a = \frac{[\text{H}^+(\text{aq})][\text{A}^-(\text{aq})]}{[\text{HA}(\text{aq})]}$$

	$[\text{HA}]$	$[\text{H}^+(\text{aq})]$	$[\text{A}^-(\text{aq})]$
I	0.20	0	0
C	-9.86×10^{-4}	9.86×10^{-4}	9.86×10^{-4}
E	0.199	9.86×10^{-4}	9.86×10^{-4}

$$K_a = \frac{(9.86 \times 10^{-4})(9.86 \times 10^{-4})}{0.199} = 4.89 \times 10^{-6}$$